

# Influenza Season Report, 2017-2018

## Background on Influenza

Influenza, or the flu, is a viral respiratory disease that occurs in seasonal waves of varying intensity. Influenza infections generally peak in the winter, but the exact timing can be unpredictable. For surveillance purposes, flu season is defined as early October (week 40) through mid-May (week 20).

Influenza is typically spread person to person by breathing droplets that have been released into the air. Less commonly, it can be spread by touching contaminated surfaces and then touching one's mouth or nose. Influenza virus types A, B, and (rarely) C cause human illness characterized by fever, cough, and/or sore throat, often with headache, muscle pain, and fatigue. Children sometimes also have gastrointestinal symptoms, such as nausea, vomiting, or diarrhea. While an influenza infection itself is often self-limiting, it can lead to serious complications including lower respiratory tract involvement (e.g., bronchitis), viral or bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes.

Annual vaccination is the primary method to prevent contracting and spreading influenza. In the case of a known exposure in an individual or group at increased risk of developing complications, post-exposure prophylaxis (PEP) in the form of antiviral medication can be used to prevent illness or lessen severity. In the general population, transmission can be reduced by regular hand washing or alcohol-based hand sanitizers, avoiding touching one's nose and mouth, and covering one's nose and mouth with a tissue or the bend of an elbow (rather than a hand) when coughing or sneezing. Sick individuals are encouraged to stay home in order to limit spreading the illness.

The influenza virus changes slightly from year to year (antigenic drift), making it necessary to receive a new vaccine each year. Periodically, the virus will change to form a completely new subtype (antigenic shift), which can lead to pandemics.

## Influenza Surveillance Methods

The Virginia Department of Health (VDH) conducts influenza surveillance year-round with heightened attention during flu season (week 40 of one year through week 20 of the next year). VDH does **not** capture data on all individual cases of influenza, but instead uses indicator variables that provide information on the larger trends of each season. Individual influenza cases can be hard to track because most people who get sick are capable of recovering on their own and do not seek medical care. Those individuals who do seek care can be diagnosed without any laboratory testing or with the use of a rapid influenza diagnostic test (RIDT). Commercially-available RIDTs are improving, but still do not meet the accuracy of laboratory confirmation methods. Because influenza is not the only respiratory disease circulating during the winter, diagnoses based on symptomatology or RIDTs alone can be false positives. In the absence of data on each individual illness, VDH uses data from emergency department (ED) and

urgent care visits for an influenza-like illness (ILI), confirmatory laboratory tests, suspected and confirmed outbreaks, and influenza-associated pediatric deaths to track trends and patterns in each influenza season and to assign a weekly activity level of geographic spread.

## ED and Urgent Care Visits for ILI

VDH receives data on ED and urgent care visits from 154 facilities throughout Virginia as part of the syndromic surveillance program. Each visit's chief complaint, or patient-stated reason for seeking medical care, is analyzed using a syndrome definition for ILI (fever with cough or fever with sore throat). These data are presented as a percent of total ED and urgent care visits in order to adjust for the increased reporting over time.

A baseline of ILI activity is calculated by taking the mean percent of ED and urgent care visits that have a chief complaint of ILI during weeks 28 through 38, before the influenza season is expected to begin. A threshold is determined by multiplying the baseline value for each region by 2.5. This creates a static value used to indicate elevated ILI in a region-specific manner. This methodology is under revision and will be updated for the 2018-19 season.

These data provide valuable information on the timing and burden of ILI, but are non-specific. Due to the nature of flu season, ILI may be caused by a number of respiratory diseases, not just influenza.

For more information on syndromic surveillance, visit the [program's VDH website](#).

## Confirmatory Laboratory Tests

Reverse transcription polymerase chain reaction (RT-PCR), viral culture, and direct fluorescent antibody (DFA) test results are considered confirmatory for influenza. Some medical providers are able to offer these tests at in-house laboratories, some send samples to commercial laboratories, and some have partnered with the Virginia public health laboratory, the Division of Consolidated Laboratory Services (DCLS) to have select specimens tested every week. In Virginia, all confirmatory lab results for influenza must be reported to VDH. These data provide details on the specific strains and subtypes circulating each year for situational awareness, future vaccine strain selection, and potential pandemic preparedness.

Because some healthcare providers have greater access to confirmatory testing methods than other providers, these data are not regionally comparable or representative.

For more information on influenza as a reportable condition, please visit the [VDH reportable disease surveillance website](#).

## Suspected and Confirmed Outbreaks

In Virginia, all outbreaks are considered a reportable condition. Suspected clusters of respiratory illness are investigated further and documented in the Virginia Outbreak Surveillance System. Influenza outbreaks are further characterized as suspected or confirmed based on the number of positive laboratory results identifying a common etiologic agent. VDH responds to reported outbreaks and

recommends collection of specimens from ill individuals for testing and confirmation of the agent at DCLS.

### Influenza-Associated Pediatric Deaths

In 2004, the Centers for Disease Control and Prevention (CDC) made influenza-associated pediatric mortality a nationally-notifiable condition, and it became a reportable condition in Virginia in 2007. VDH acts as the reporting agency by investigating, collecting, and providing data on each case including virus subtype, vaccination history, and any viral or bacterial coinfections. Only the child's age group and geographic region are reported to the public in order to maintain privacy and sensitivity.

### Activity Level

VDH calculates an activity level for each week throughout the flu season using a combination of ILI visits, confirmatory lab, and outbreak data. This activity level represents the geographic spread of influenza throughout Virginia and includes the levels No Activity, Sporadic, Local, Regional, and Widespread.

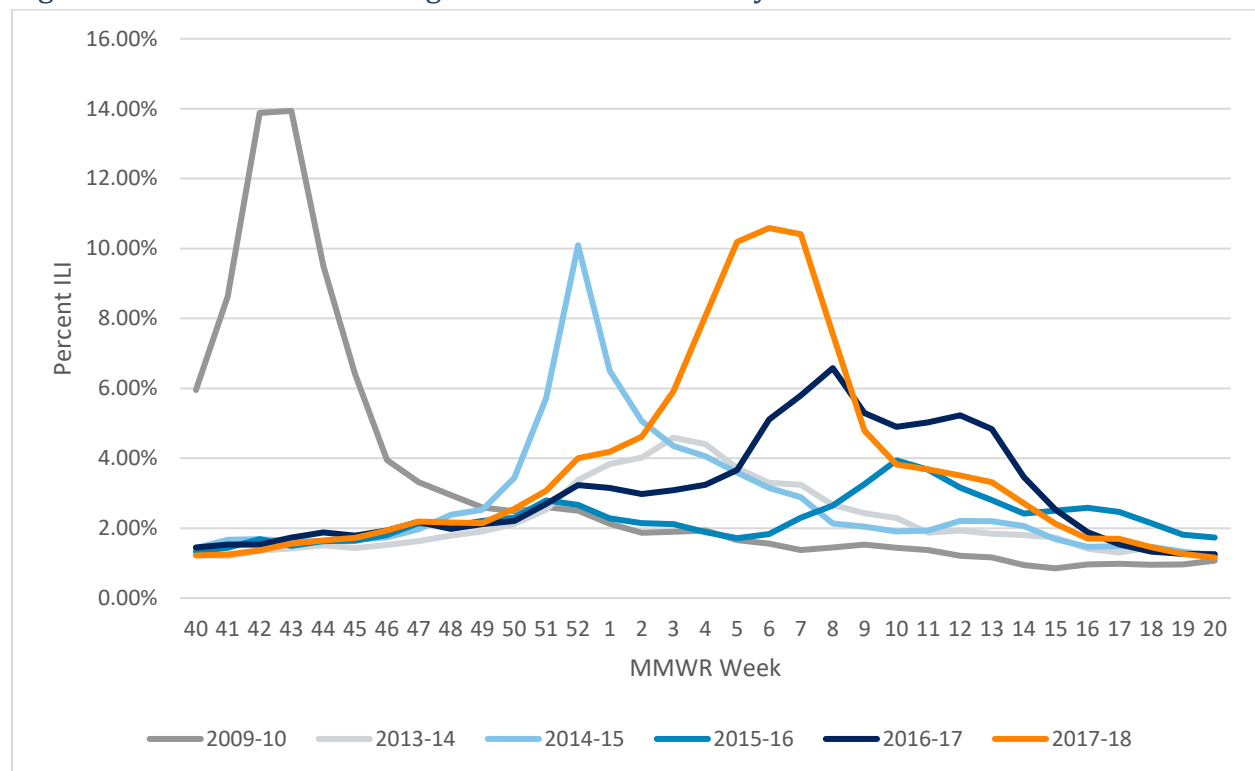
## Results

The 2017-18 flu season represented a higher morbidity and mortality burden than in recent years.

### ED and Urgent Care Visits for ILI

The percent of ED and urgent care visits for ILI peaked in the 2017-18 season at 10.6% during week 6 (early February). This was the second-highest percent ILI since syndromic surveillance reporting began in 2003. (The highest percent ILI occurred during the 2009 H1N1 pandemic and does not represent seasonal flu).

Figure 1: Percent of ED and Urgent Care Visits for ILI by Flu Season



By region, the Eastern region peaked the highest above threshold (7.7 times threshold during week 7) and remained elevated the latest (102% of threshold during week 19).

The Northwest region peaked earliest in the season at 8.7% of total ED and urgent care visits during week 5 (484% of threshold). The Southwest region followed, peaking in week 6 at 10.9% of total visits (733% of threshold). The Central, Eastern, and Northern regions all peaked in week 7 at 10.9% (702% of threshold), 12.1% (770% of threshold), and 11.1% of total ED and urgent care visits (325% of threshold), respectively.

Figure 2: Percent of ED and Urgent Care Visits for ILI by Region, 2017-18 Flu Season

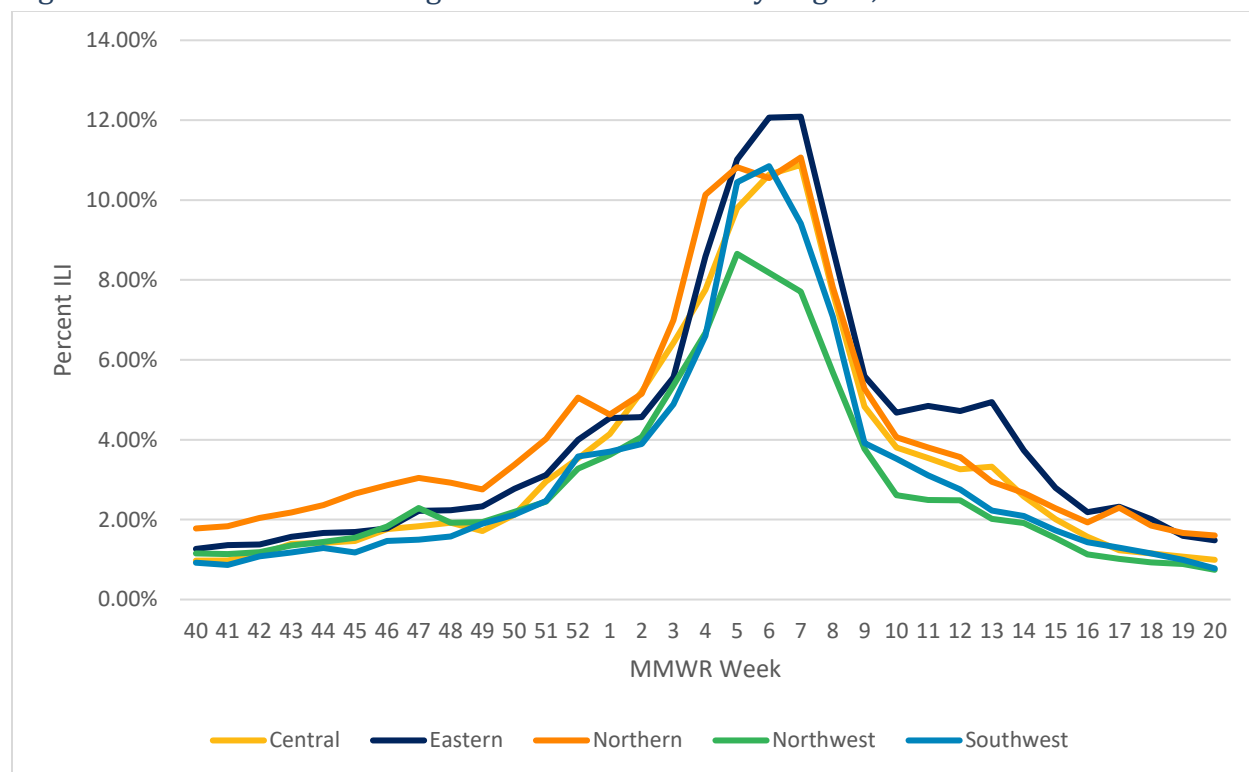


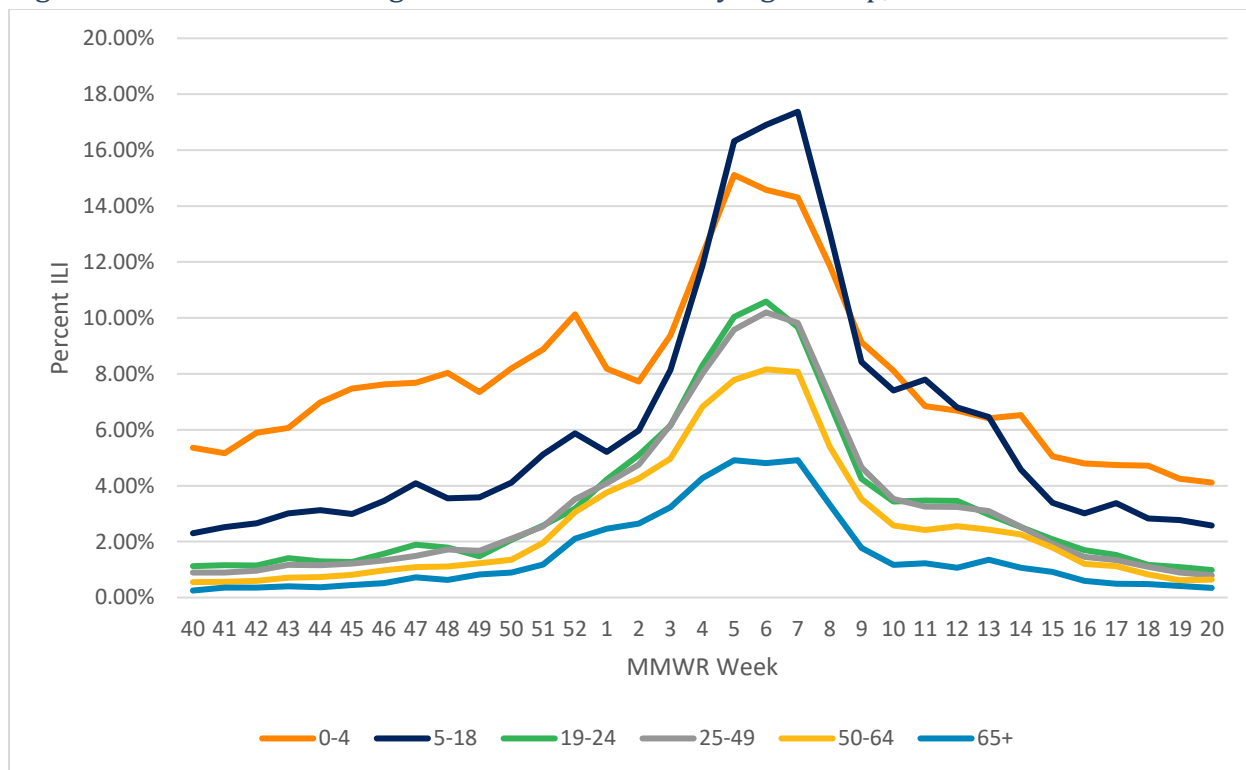
Table 1: Baseline and Threshold Percent of ED and Urgent Care Visits for ILI by Region, 2017-18 Flu Season

Region	Baseline	Threshold
Central	0.62%	1.55%
Eastern	0.63%	1.57%
Northern	1.36%	3.41%
Northwest	0.72%	1.79%
Southwest	0.59%	1.48%

By age group, the greatest percentage of ED and urgent care visits for ILI was observed in those aged five to 18 years (17.4% in week 7).

ILI visits among children aged zero to four peaked in week 5 at 15.1% of total ED and urgent care visits. Visits among adults aged between 19 and 64 years followed, with three consecutive age groups peaking in week 6. Visits for ILI peaked among both persons aged 5 to 18 years and those aged at least 65 years during week 7 at 17.4% and 4.9%, respectively.

Figure 3: Percent ED and Urgent Care Visits for ILI by Age Group, 2017-18 Flu Season



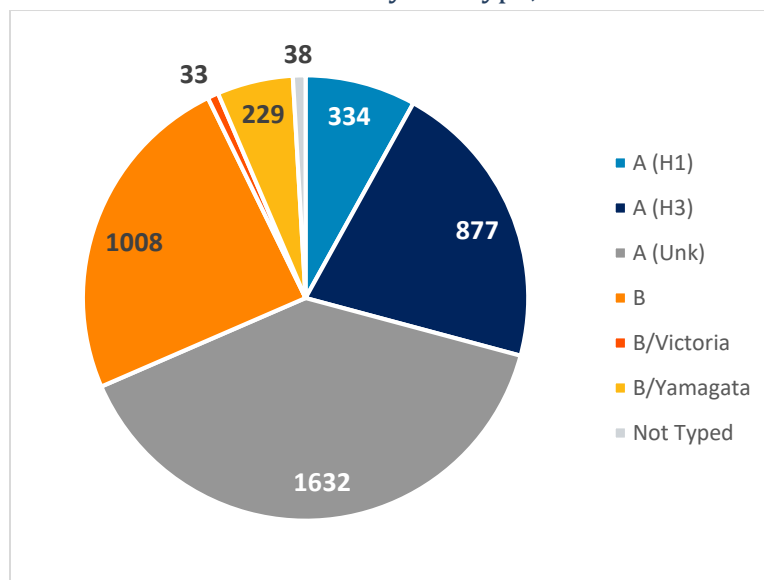
## Confirmatory Laboratory Tests

The quantity of confirmatory laboratory tests received by VDH has increased in recent years due to more prevalent use of the RT-PCR methodology. During weeks 40 of 2017 through 20 of 2018, VDH received lab results on 4,338 specimens. This represented 2.3 times as many lab results received in the 2016-17 season and 4.7 times as many lab results received in the 2015-16 season.

Of those 4,338 specimens, 4,150 (96%) were positive. This represented 4,156 distinct influenza infections because six specimens tested positive for multiple influenza virus types or subtypes.

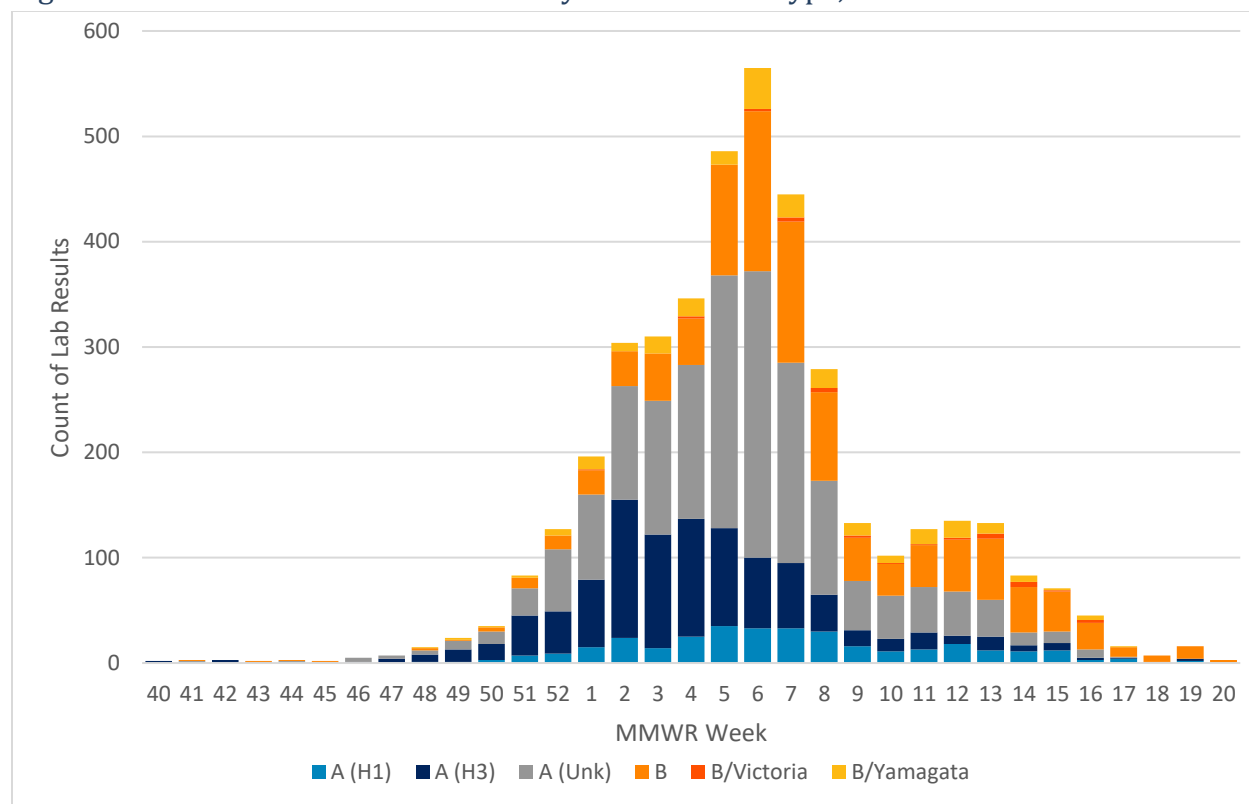
During the 2017-18 flu season as a whole, 2,843 (68.4%) specimens tested positive for an influenza A virus, while 1,270 (30.6%) tested positive for influenza B. Among those influenza A specimens that were further subtyped, 877 (72.4%) were identified as A (H3) and 334 (27.6%) were identified as A (H1). The 2017-18 flu season was predominantly an A (H3) season, but the breakdown represents the closest split between A (H3) and A (H1) on record. Among those influenza B specimens that were further subtyped, 229 (87.4%) were identified as B/Yamagata and 33 (12.6%) were identified as B/Victoria. This is the first flu season that influenza B subtype characterization has been available in Virginia.

Figure 4: Proportion of Positive Lab Results by SubType, 2017-18 Flu Season



The peak of both influenza A and B infections occurred in week 6 with 272 influenza A results and 193 influenza B results. Influenza B, however, continued to circulate longer, making up more than 50% of total positive lab results starting in week 13.

Figure 5: Count of Positive Lab Results by Week and Subtype, 2017-18 Flu Season



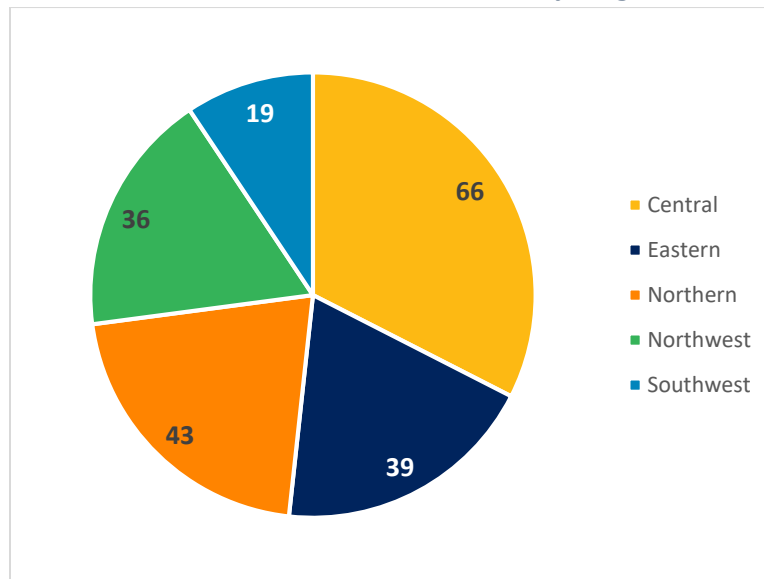


## Suspected and Confirmed Outbreaks

During the 2017-18 flu season, VDH received reports of 203 outbreaks suspected to be due to influenza. Of these, 117 (57.6%) were confirmed to be due to influenza.

By region, the greatest number of suspected or confirmed outbreaks was observed in the Central region with 66 total outbreaks (26 [39.4%] confirmed). A total of 43 outbreaks were observed in the Northern region (20 [46.5%] confirmed), 39 in the Eastern region (31 [79.5%] confirmed), 36 in the Northwest region (23 [63.9%] confirmed), and 19 in the Southwest region (17 [89.5%] confirmed).

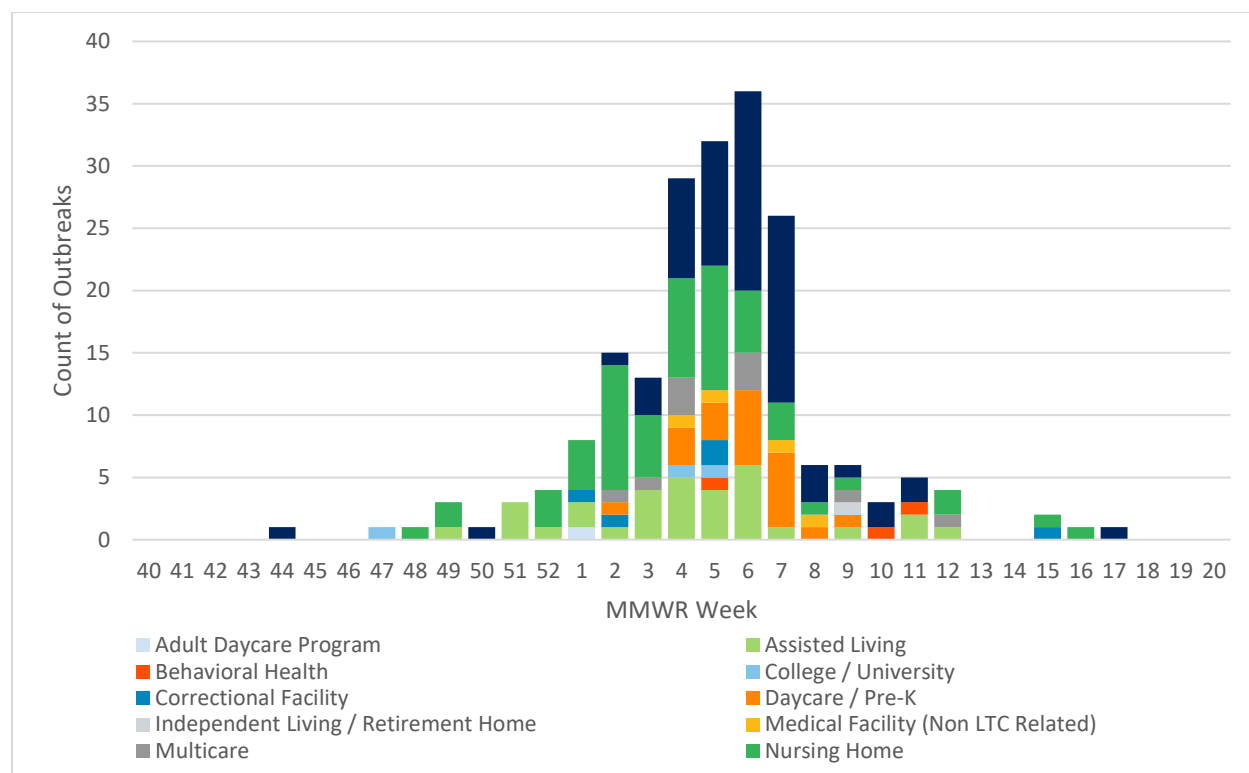
Figure 6: Suspected and Confirmed Influenza Outbreaks by Region, 2017-18 Flu Season



By facility type, 64 (31.5%) suspected or confirmed outbreaks were reported in school settings (K-12), 57 (28.1%) in nursing homes, 32 (15.8%) in assisted living facilities, 21 (10.3%) in daycare or pre-kindergarten settings, 10 (4.9%) in multicare facilities, 5 (2.5%) in correctional facilities, 4 (2.0%) in medical facilities, 3 (1.5%) each in behavioral health centers and colleges or universities, and 1 (0.5%) each in adult daycare settings and independent living or retirement homes.

Week 6 saw the greatest number of suspect or confirmed outbreaks reported to VDH with 36.

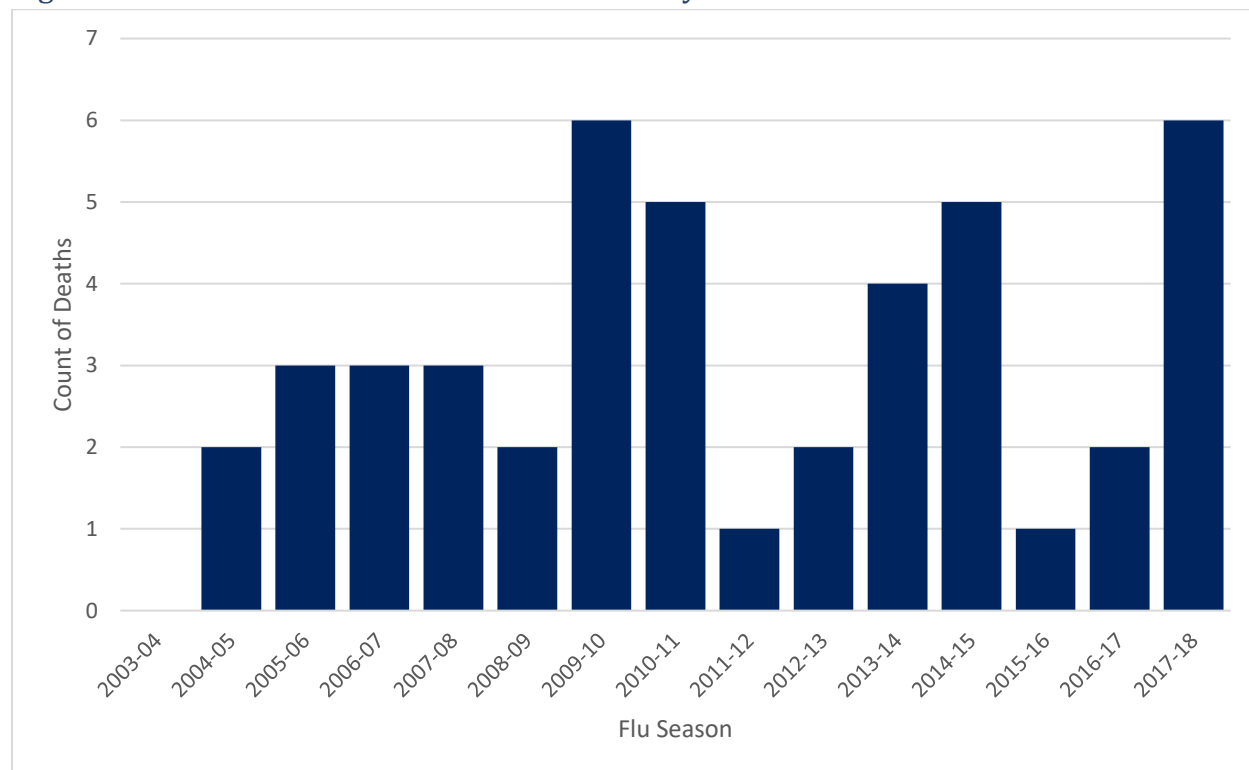
Figure 7: Suspected and Confirmed Influenza Outbreaks by Week and Facility Type, 2017-18 Flu Season



## Influenza-Associated Pediatric Deaths

Six influenza-associated pediatric deaths were reported in the 2017-18 flu season. Three (50%) were in the Southwest region, and one (17%) each in the Northwest, Central, and Northern regions. Two deaths (33%) occurred among preschool-aged children and four (67%) among young school aged children. The six deaths reported in the 2017-18 season match the 2009-10 pandemic season as the highest mortality burden since VDH began collecting data on influenza-associated pediatric deaths.

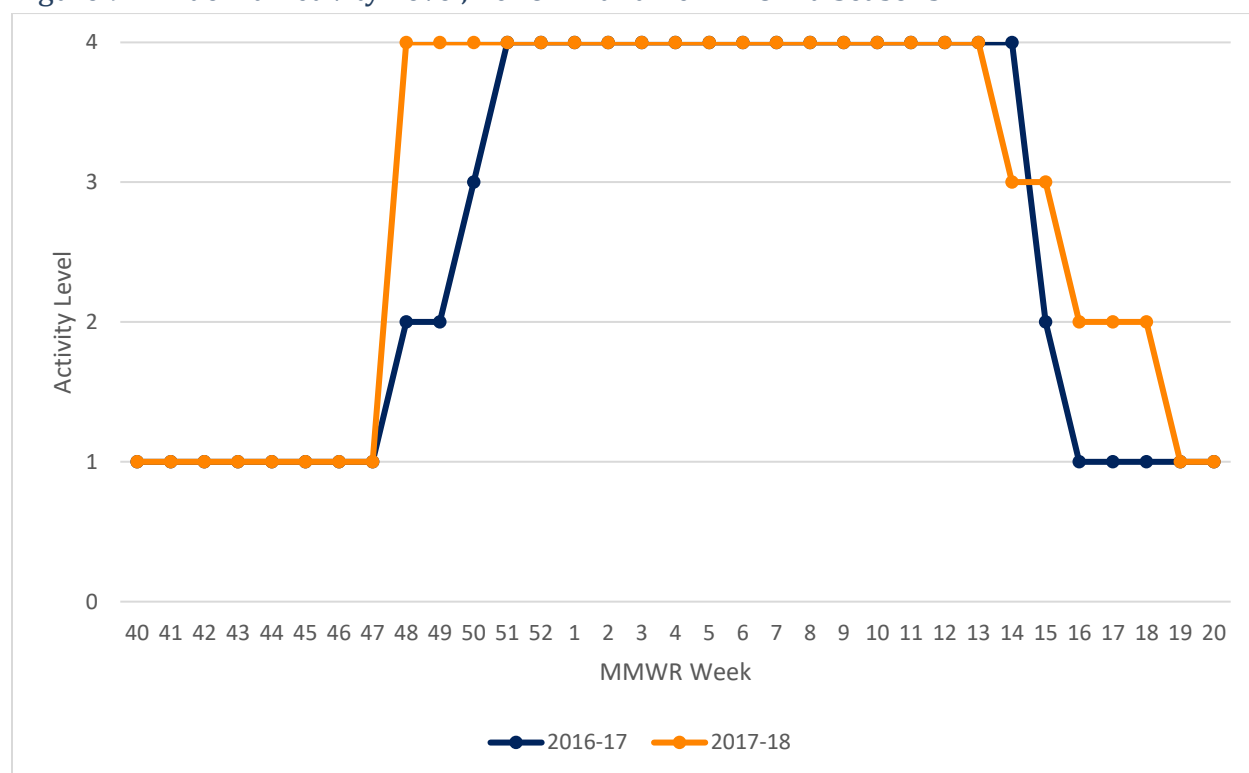
Figure 8: Influenza-Associated Pediatric Deaths by Flu Season



## Activity Level

Virginia rose from Sporadic influenza activity to Widespread activity during week 48 (early December) of the 2017-18 season. The activity level remained at Widespread until week 13 of 2018, for a total of 18 weeks at the highest level of geographic spread. During the previous five seasons, the average length of time spent at Widespread influenza activity was 12 weeks.

Figure 9: Influenza Activity Level, 2016-17 and 2017-18 Flu Seasons



## Conclusion

The 2017-18 flu season was a predominantly influenza A (H3) season with high levels of influenza-like illness in emergency department and urgent care visits, confirmatory laboratory results, suspected and confirmed outbreaks, influenza-associated pediatric deaths, and time spent with Widespread geographic activity.

The Virginia season largely matched what was seen on the national scale. The CDC reported a peak in ILI visits at 7.5% of total visits during week 5, the second highest peak in recent years behind the 2009-10 pandemic season. The CDC received data on 1,210,053 specimens tested for influenza. Among positive specimens, 151,413 (67.6%) were positive for influenza A and 72,700 (32.4%) were positive for influenza B. Among public health laboratory results that were further subtyped, 31,977 (84.9%) influenza A specimens were positive for A(H3N2) and 5,704 (15.1%) were positive for A(H1N1)pdm09. While the national proportion of influenza A (H1) was smaller than that seen in Virginia, the CDC notes that the proportion ranged regionally with the southeastern United States seeing more A(H1N1)pdm09. Additionally, the Virginia laboratory results are difficult to interpret because of the large percentage of influenza A viruses that are not further characterized, which is not a factor in the laboratory data reported by CDC. Among influenza B results that were further subtyped at the national level, 10,612 (88.8%) were B/Yamagata and 1,338 (11.2%) were B/Victoria. As of June 1, 2018, 171 influenza-associated pediatric deaths had been reported to the CDC for the 2017-18 flu season. This number matched what was reported in the 2012-13 flu season, but falls well below the 358 pediatric deaths reported during the 2009-10 pandemic season. In terms of geographic spread, for weeks 1-3, 50 states and territories (93%) reported Widespread influenza activity. The previous five-year peak of states and territories reporting Widespread influenza activity during a single week was 48.

The CDC has developed a new method of categorizing the severity of flu seasons based on the percentage of visits for ILI, hospital admissions for influenza, and pneumonia and influenza mortality. Applying this methodology retrospectively, the 2017-18 flu season was only the second to qualify as High severity, and the only season to have a high severity in each age group.

For more information on the national picture of influenza surveillance for the 2017-18 season, see the [June 8 Morbidity and Mortality Weekly Report \(MMWR\) article](#).

As Virginia prepares for the 2018-19 flu season, these data provide a harsh and sometimes tragic reminder of the importance of the influenza vaccine and basic illness prevention methods. For more information on the upcoming season's vaccine, please see the [VDH Division of Immunization's website](#).